



Armed Forces College of Medicine AFCM



Histological Structure of Oral Cavity

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INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Classify the types of oral mucosa.
2. Describe the structure of lining and masticatory mucosa.
3. Describe the structure of lip, tongue, palate and pharynx.
4. List the different types of lingual papillae.
5. Compare between the different types of tongue papillae
6. Describe the EM structure of taste buds.
7. Correlate the altered microscopic structure of the oral



Key points of this lecture



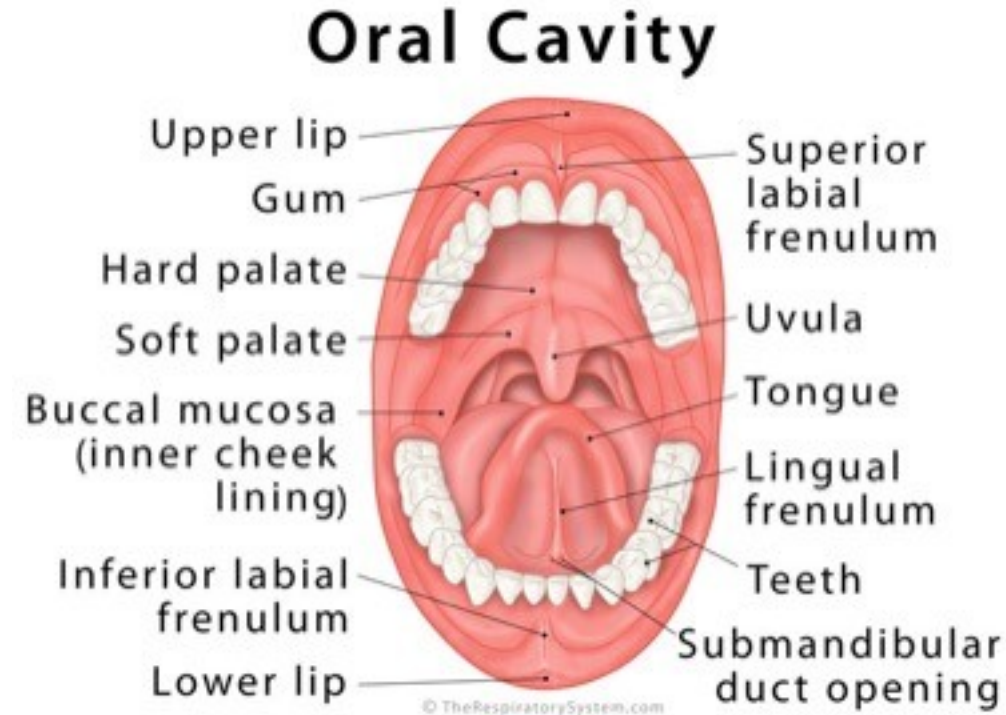
- 1- Types of oral mucosa and their lining epithelium & their structural defect in canker and cold sores.
- 2- Histological structure of the lip.
- 3- Histological structure of tongue.
- 4- Shape and structure of different lingual papillae.
- 5- Different cells of taste bud and their renewal.
- 6- Lining epithelium of hard and soft palate.
- 7- Lining epithelium and lamina propria of oro, naso and laryngopharynx.



The Oral Cavity



- Lined with stratified squamous epithelium, which may be keratinized, or non-kerat. depending on the location.
- The flattened superficial cells of the oral epithelium undergo continuous desquamation.



www.therespiratorysystem.com

- Throughout the oral cavity, the epithelium contains transient antigen-presenting cells and rich sensory innervation.



Types of oral mucosa:

1- Masticatory mucosa: in gingiva & hard palate (areas of friction).

- St. Sq. kerat. epith. Lying directly on periosteum.

2- Lining mucosa. In lips, cheeks, floor of mouth, soft palate & pharynx.

- St.sq. non ker. Epith. For protection.
- Submucosa with minor salivary glands, and diffuse lymphoid tissue).



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Structure of the Lip



Outer Thin skin:

Epidermis: stratified sq. kerat. epith.

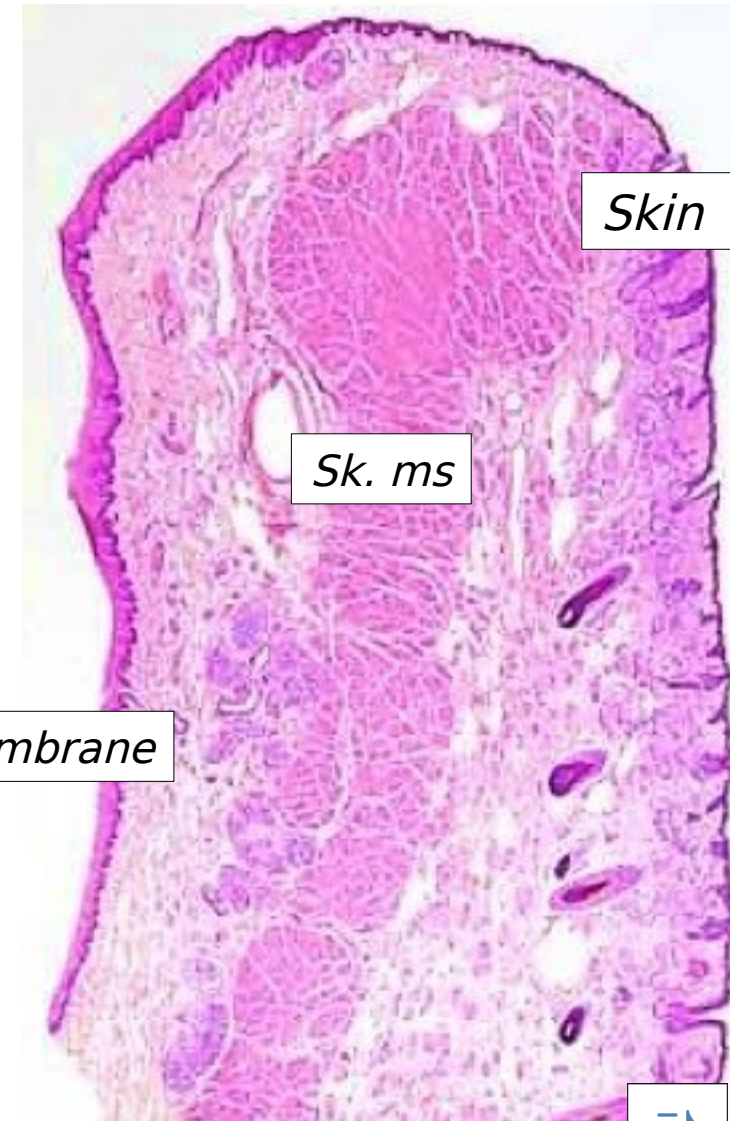
Dermis: Loose C.T. with hair follicles, sebaceous gl. and sweat gl.

Orbicularis oris ms: A well developed core of circular **skeletal muscle** fibers.

Internal mucous membrane:

- **Epithelium:** Thick stratified sq. non-k. ep.

- **Lamina propria:** loose C.T. containing labial glands (mainly mucous acini).



Mucous membrane

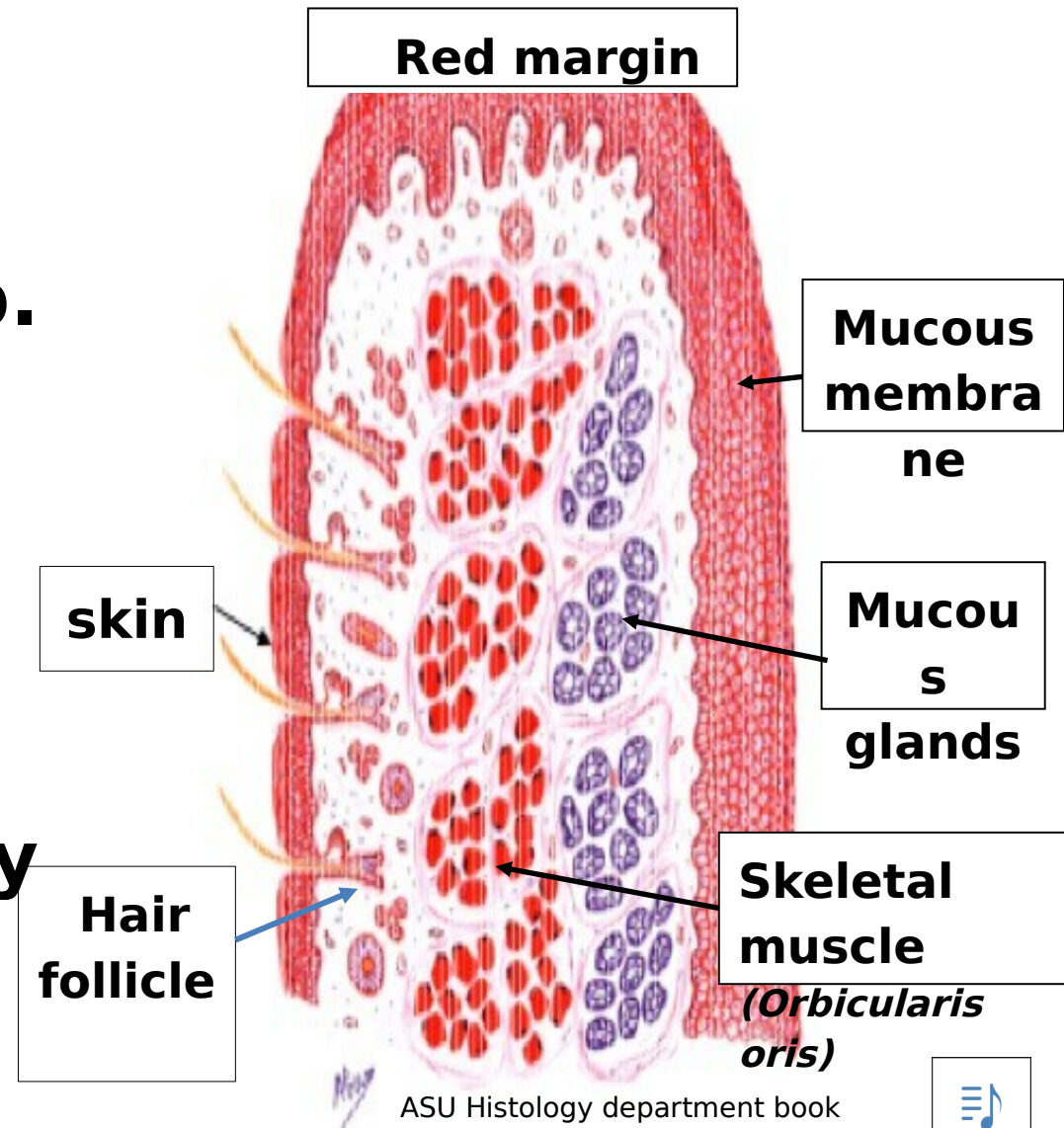


Vermilion zone (red margin):

1- Modified skin

- Very thin St. sq. kerat. ep. (**transparent**).
- No sweat nor salivary glands.
- No hair follicles.
- No sebaceous glands.

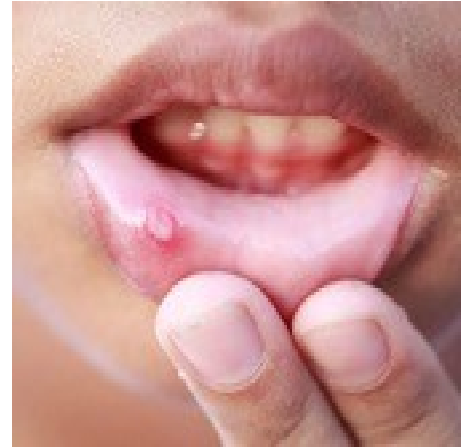
2- Numerous deep highly vascular dermal papillae pink color.



Clinical appl Canker & cold sores



- These are painful, clustered vesicular or ulcerating lesions of the oral mucosa or skin near the mouth.
- In the **oral cavity** such areas are called **canker sores**, and on **the skin**, they are usually called **cold sores or fever blisters**.
- **Causes of cold sores:**
Weak immune defenses due to emotional stress, fever, illness, or local skin damage, allowing the **Herpes Simplex virus**, present in local nerves, to move into the epithelial cells.....death of



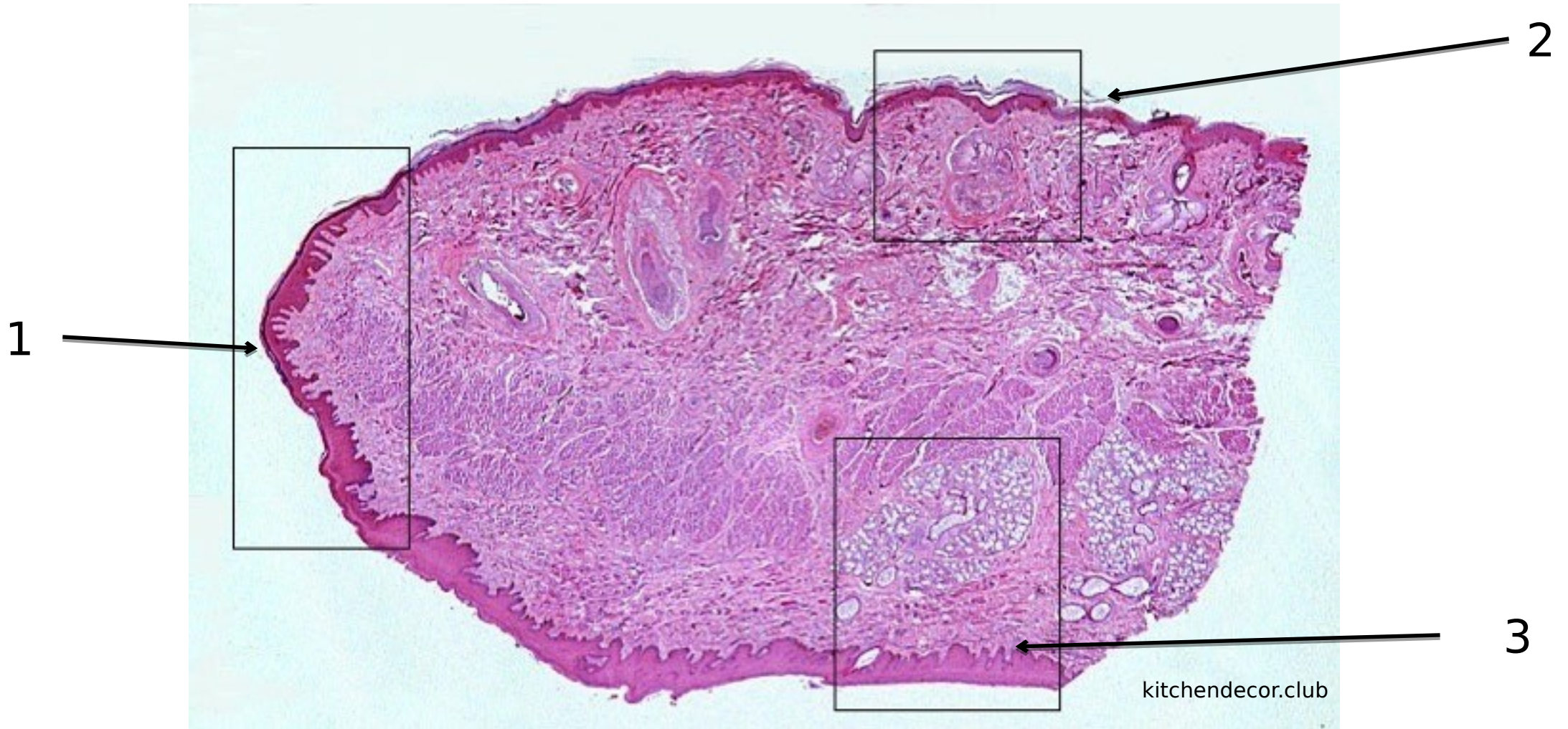
Medicinenet.com



QUIZ



QUIZ



QUIZ



A 27 years old female went to the plastic surgeon for lip augmentation. The surgeon suggested injection of the lip by hyaluronic acid filler. Which of the following is a unique structural characteristic of the injected part?

- a) Poor sensory innervation
- b) Absence of sweat glands
- c) Numerous hair follicles
- d) Scanty blood capillaries
- e) Thick epidermis



Tongue

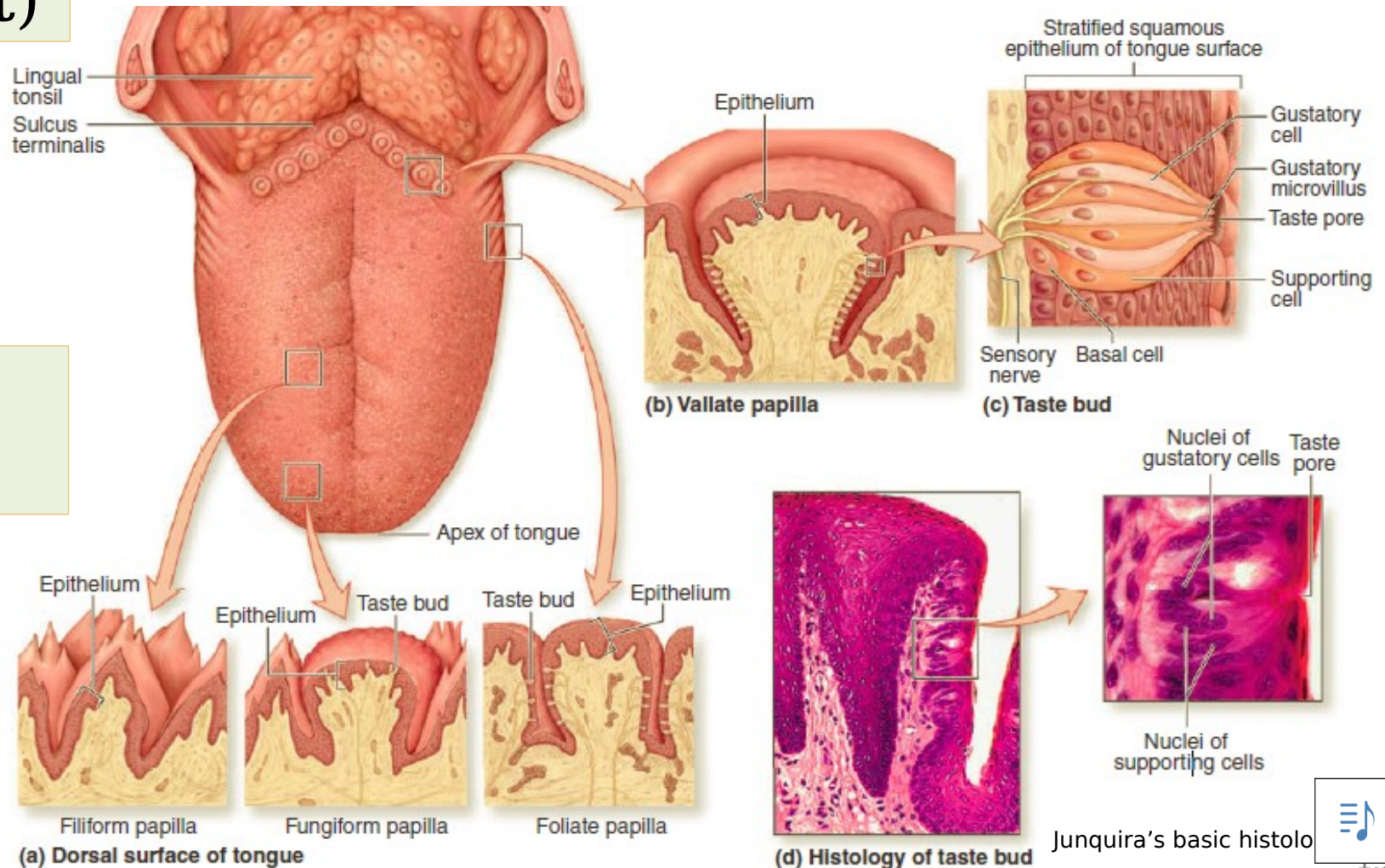


Posterior 1/3 (pharyngeal part)

Contains lingual tonsils

Anterior 2/3 (oral part)

Contains lingual papillae



Tongue



Dorsal surface

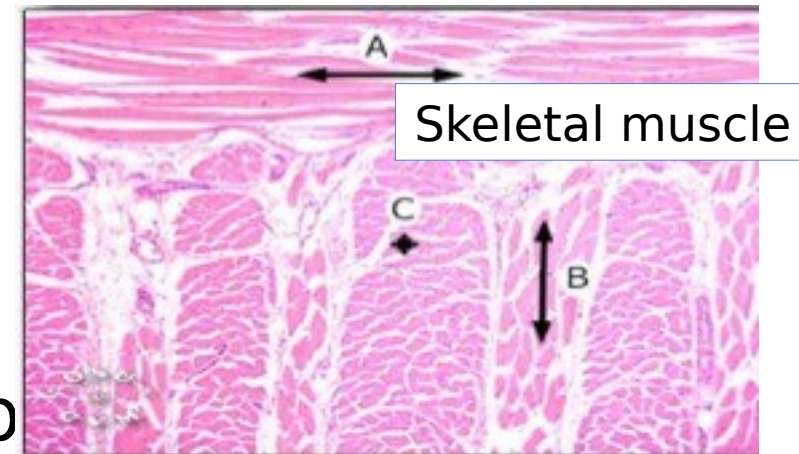
Rough, shows lingual papillae anteriorly and lingual tonsils posteriorly, separated by a V-shaped groove called the **sulcus**

Striated muscle

Arranged in 3 **perpendicular** directions;
longitudinal, transverse and
vertical.

Smooth surface, lined by st. sq. non kerat. Ep

lingual glands (serous, mucous and mixed acini).



instruction.cvhs.okstate.edu



Lingual papillae



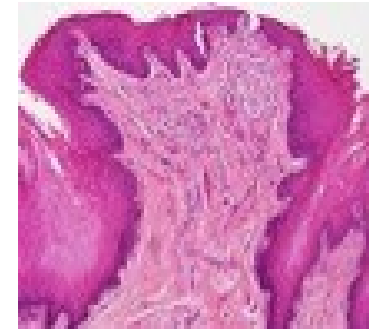
They are mucous membrane elevations including epithelium & lamina propria.

Types of lingual papillae:

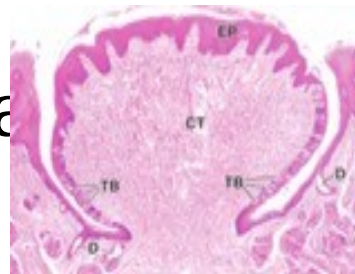
- **Filiform** papillae
- **Fungiform** papillae
- **Circumvallate** papillae
- **Foliate** papillae



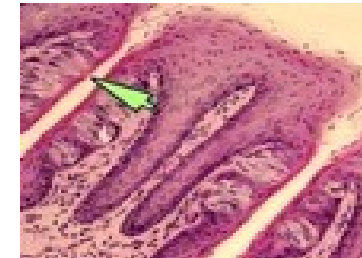
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medicalhistology.us



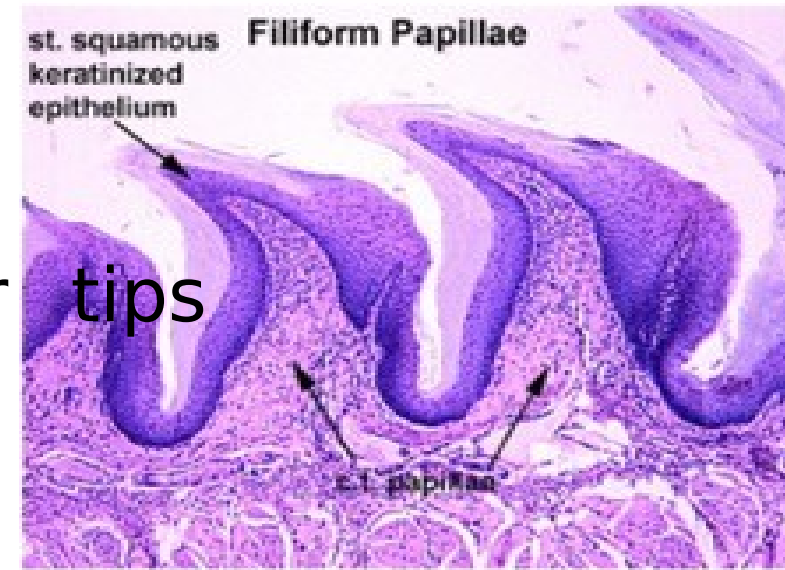
siumed.edu



1- Filiform papillae



- Numerous on ant. 2/3. of tongue
- Elongated conical shape with their tips pointing backwards.
- Heavily keratinized → grey or whitish appearance.
- No taste buds.
- Provides rough surface that facilitates food movement during chewing.



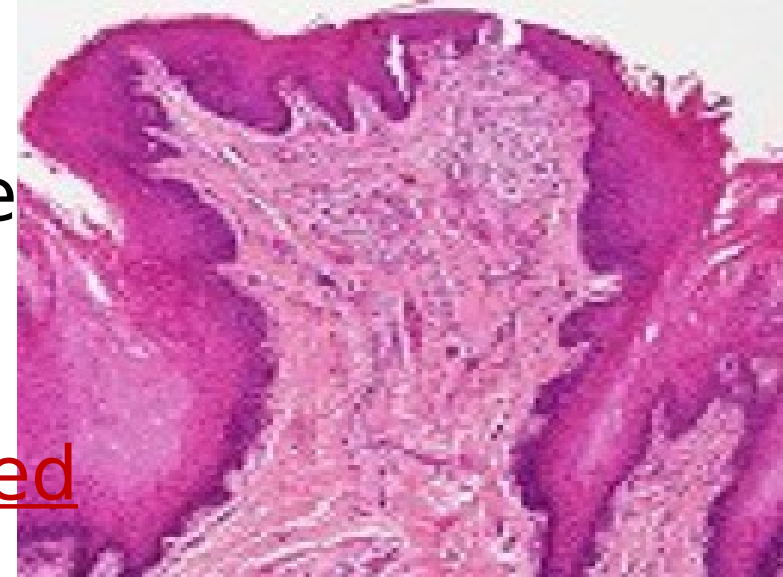
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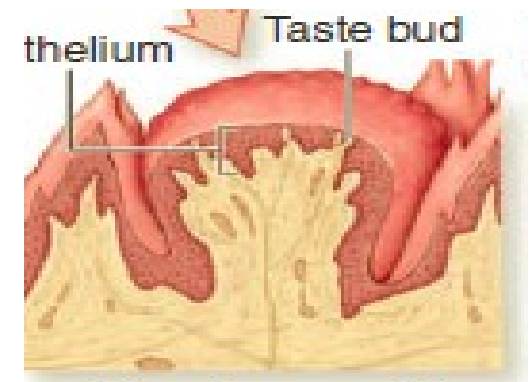
2- Fungiform papillae



- Few, scattered across the dorsal surface
- Mushroom-shaped
- Lightly keratinized, well vascularized (red spots).
- Few Taste buds on their upper surface.
- For taste sensation.



aboutlink.info



Fungiform papilla

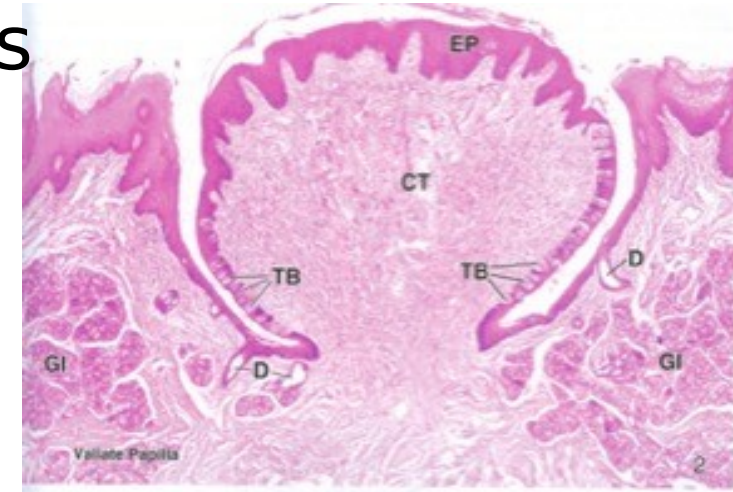
Junqueira's basic histology



3- Circumvallate papillae



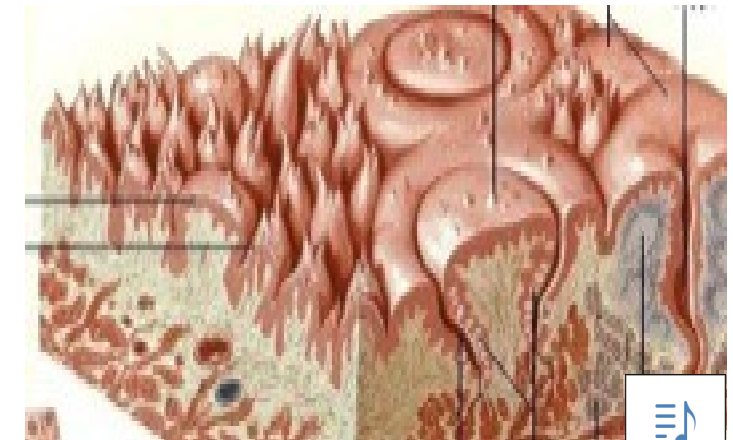
- **Largest** papillae, 8- 12 in number, lies in a V-shape just anterior to the sulcus terminalis.
- **Abundant taste buds** (250) on the lateral sides.
- Surrounded by **circular deep grooves** continuously flushed by the **serous** secretion of **Von Ebner's glands**



medicalhistology.us



Clear the grooves which encircle the papillae and contains **lipase** enzyme
(Prevents formation of a hydrophobic film that would hinder gustation)



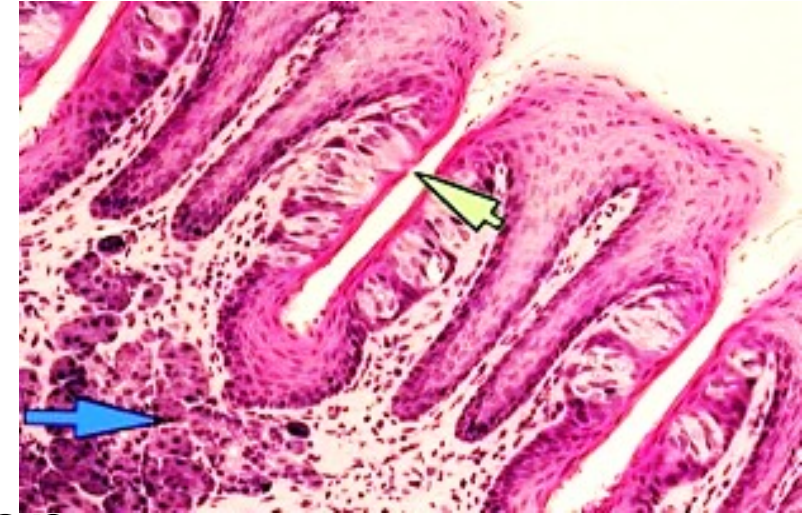
slideshare.net



4- Foliate papillae



- More in young persons, and rudimentary in old age.
- On sides the tongue.
- Several parallel ridges separated by deep grooves.
- Von Ebner's glands are present in the lamina propria
- Numerous taste buds on the sides.



.siumed.edu



QUIZ

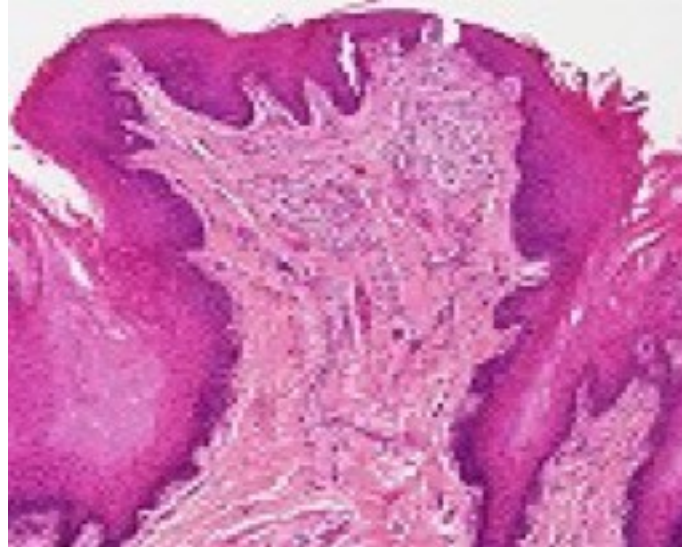


QUIZ



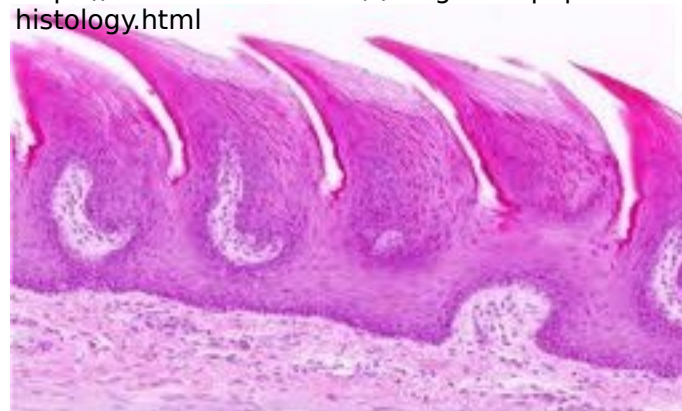
Label the following

1-



<https://www.aboutlink.info/f/fungiform-papillae-histology.html>

2-



[.studyblue.com/](https://www.studyblue.com/)



QUIZ



A histologist was assigned to examine a box filled of unlabeled stained slides of the GIT. Which of the following uniquely characterizes a slide containing the lingual muscle?

- a) Being formed of smooth fibers.
- b) Branching and anastomosing fibers.
- c) Covered by simple columnar epithelium.
- d) Present in the anterior part of the tongue.
- e) Running in three perpendicular directions.



QUIZ



On examining a biopsy of tongue, which of the following is a characteristic histological feature for the type of papillae that facilitate chewing of food?

- a) Appear rounded in outline
- b) Contains numerous taste buds
- c) Cover the posterior $\frac{2}{3}$ of the tongue
- d) Covered with kerat. st. sq. epithelium.
- e) Present on the sides and tip of tongue



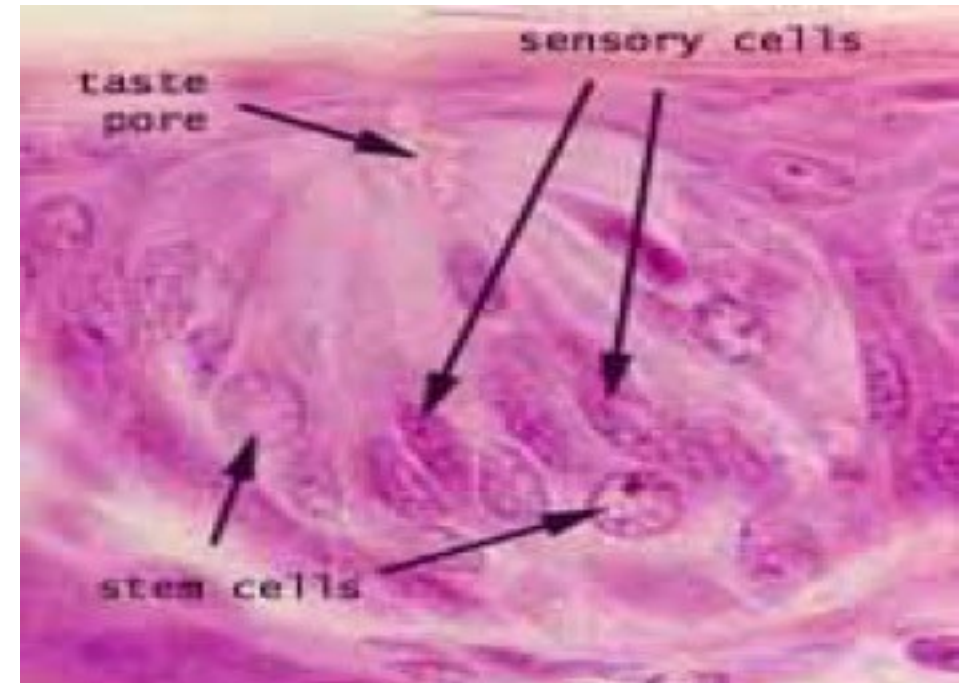
Taste Buds



- **Site:** dorsal surface of the tongue, soft palate, pharynx, epiglottis.
- **Structure:**

Oval-shaped, rest on the basement membrane with an apical taste pore.

- Each taste bud is formed of:
 - 1- **Neuroepithelial** cells (light cells)
 - 2- **Supporting** cells (dark cells)
 - 3- **Basal** stem cells



Taste buds



cells):

- Elongated columnar cells with apical microvilli projecting from the taste pore.
- Free nerve endings contact their basal surface.

2- Supporting cells:

- Peripherally located elongated columnar cells.
- Support and secrete an amorphous material which surrounds the microvilli.



<http://www.siumed.edu/~dking2/erg/oralcav.htm>

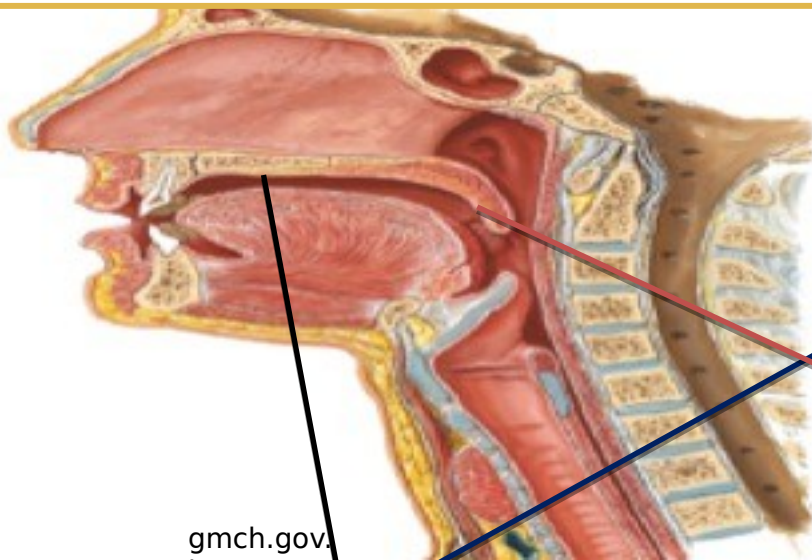
3- Basal cells:

Stem cells present near the base of the taste buds.

They give rise to the other types of cells of the taste bud. Their life span is about **7-10**



Palate



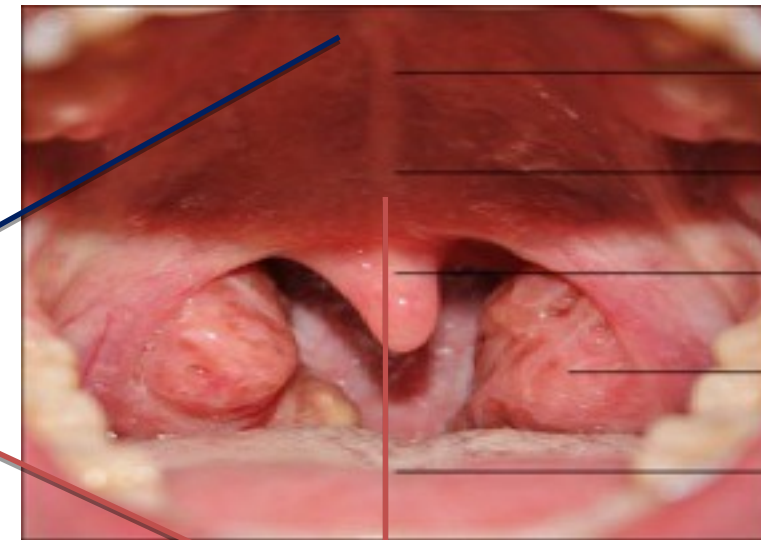
gmch.gov.
in

Soft Palate

Posterior $\frac{1}{3}$ of roof

Movable (**skeletal muscles**)

Inferior oral part is lined with st. sq.
non-K. ep.
Superior nasal part is covered with
respiratory epith.



shutterstock.com

Hard Palate

Anterior $\frac{2}{3}$ of roof

Immovable (**Bone**)

Keratinized st. sq. epith
adherent to bone



Pharynx



1-Nasopharynx:

- Lined with pseudostratified ciliated columnar ep. with goblet cells

- Lamina propria contains

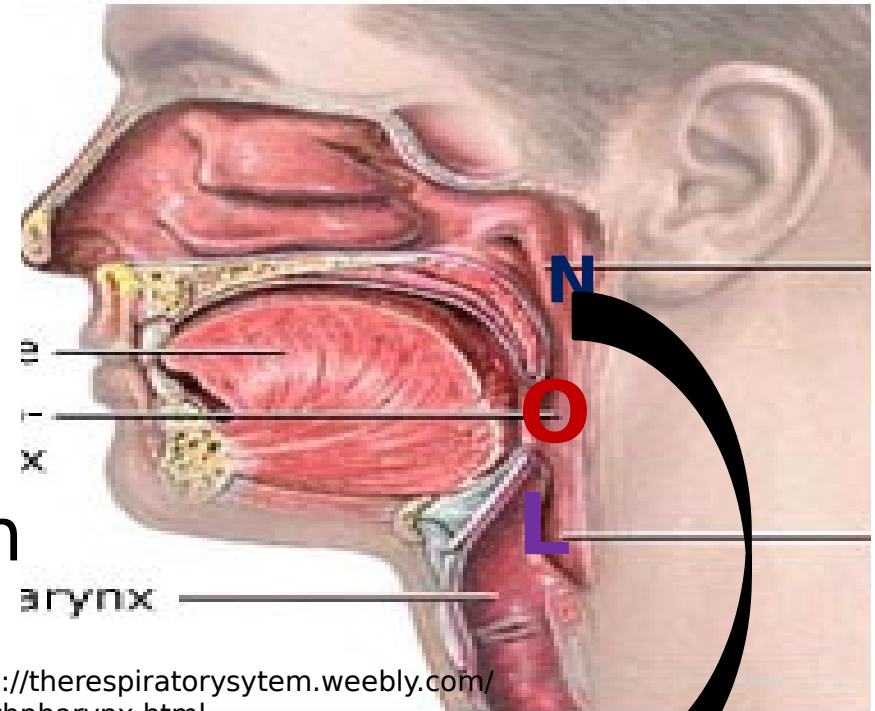
- **pharyngeal tonsils.**

- Lined with stratified squamous non kerat. ep

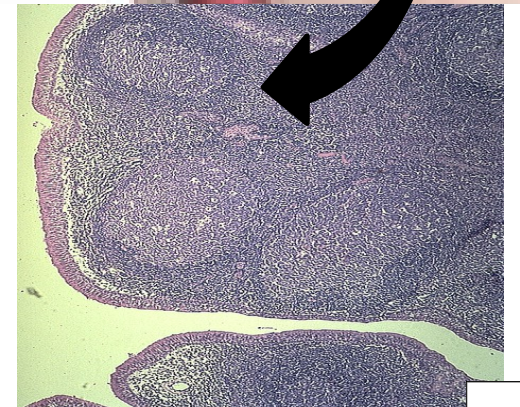
- Lamina propria contains **palatine**

3- **Laryngopharynx**

lined by stratified squamous non-keratinized ep.



<https://therespiratorysystem.weebly.com/mouthpharynx.html>



QUIZ



QUIZ

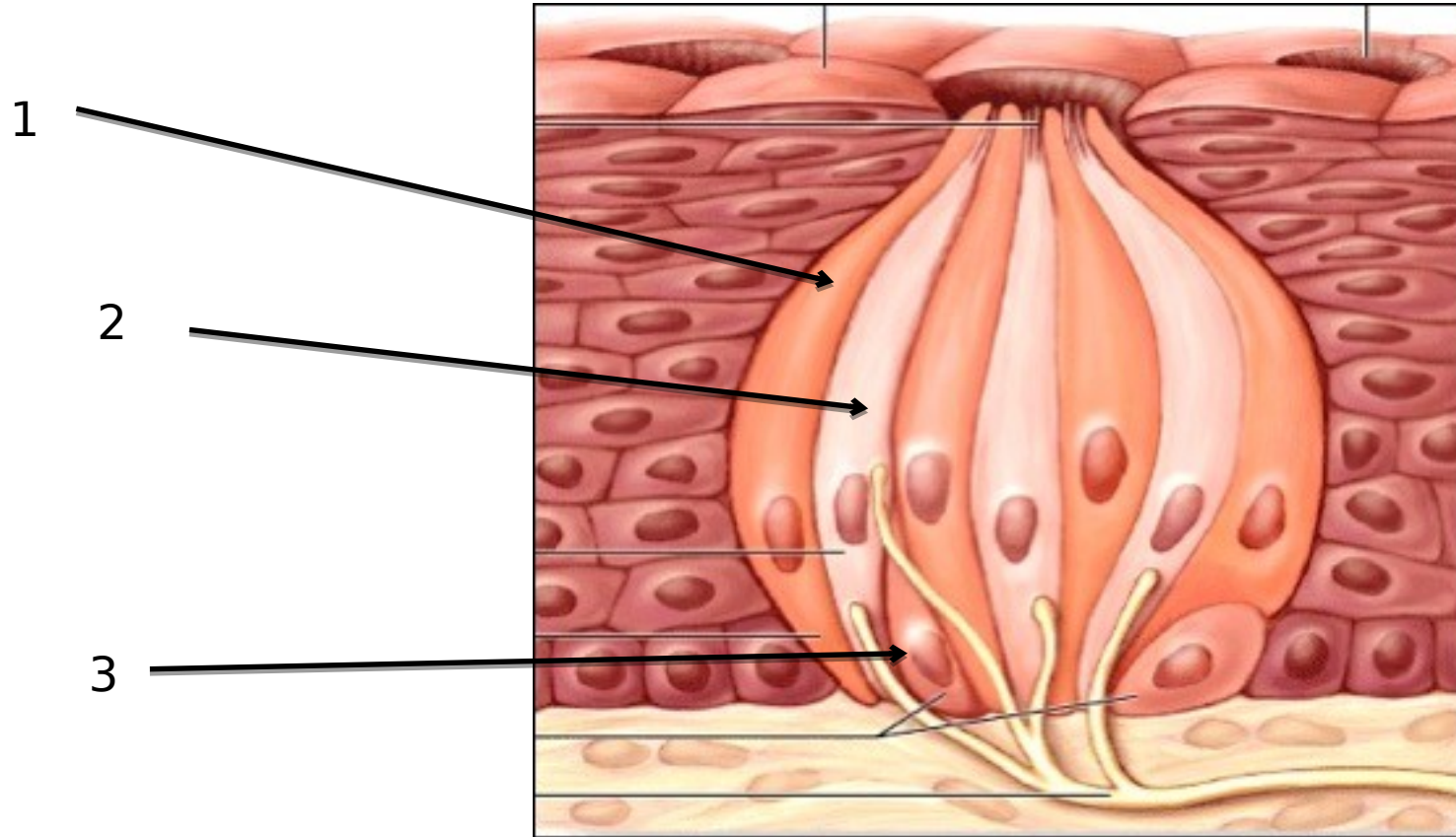


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QUIZ



In which of the following structures of the oral cavity would taste buds be localized in the highest concentration?

- a) Gingiva
- b) Vallate papillae
- c) Filiform papillae
- d) Fungiform papillae
- e) Ventral surface of the tongue



QUIZ



While examining a 60 year old man in a regular checkup, the doctor suspected a lesion in the back of the roof of the mouth, and suggested to take a biopsy. What type of epithelium is expected to be seen on the upper surface of this part?

- a) Stratified squamous keratinized epithelium.
- b) Stratified squamous non keratinized epithelium.
- c) Pseudostratified epithelium with goblet cells.
- d) Stratified columnar epithelium.
- e) Simple columnar epithelium with goblet cells.



Summary



The **oral cavity** is lined primarily by **mucosa** with **nonkeratinized stratified squamous epithelium**, with **keratinized stratified squamous epithelium** on the **hard palate** and **gingiva**.

The dorsal surface mucosa of the tongue has projecting **lingual papillae** of four types: **filiform** papillae with keratinized epithelium and nonkeratinized **foliate**, **fungiform**, and large **circumvallate** papillae.

All lingual papillae, except the filiform type, have epithelial **taste buds** on their sides, with chemosensory **gustatory cells** with synapses to basal sensory innervation, **supporting cells**, and an apical **taste pore**.



Remember the Key points of this lecture



- 1- Types of oral mucosa and their lining epithelium.
- 2- Histological structure of the lip.
- 3- Histological structure of tongue.
- 4- Shape and structure of different lingual papillae.
- 5- Different cells of taste bud and their renewal.
- 6- Lining epithelium of hard and soft palate.
- 7- Lining epithelium and lamina propria of oro, naso and laryngopharynx.



Suggested textbooks



1- Junqueira`s Basic Histology; Text and Atlas. 15th edition 2018, pp: 298-300.

2- Michael H. Ross and Wojciech Pawlina. Histology atlas and test:, 7th edition, 2015, pp: 572-581





**Thank
You**

Mahalo
Kiitos

Tack
Grazie
Obrigado
Thanks
Takk
Gracias
Merci

